

**System and Method for Binding Processes in an  
E-Commerce HUB**

**BACKGROUND OF THE INVENTION**

**1. Technical Field**

5       The present invention relates in general to a system and method for binding processes in an e-commerce HUB. More particularly, the present invention relates to a system and method for providing an open platform for e-commerce business transactions and a translation method for  
10   document exchange.

**2. Description of the Related Art**

      E-commerce business transactions are conducted by the electronic interchange of business documents. Electronic documents may represent purchase orders, requests for bids,  
15   invoices, or an agreed acknowledgement of a receipt. Various standards exist for the definition and exchange of electronic documents. For example, Rosetta Net, cXML, and EDI are industry standards for electronic document exchange. Custom electronic exchange definitions also  
20   exist for specific businesses within a particular industry.

      The complexity of electronic exchange definitions is increasing to enable trading partners to go beyond the simple exchange of documents. For example, trading partners may collaborate on additional subjects, such as  
25   supply chain management. A challenge with existing art is that trading partners pre-agree on a business process and may be confining themselves to a limited set of trading partners.

Applications are available that document, agree, and execute processes on a peer-to-peer basis between trading partners, such as Extricity Alliance and WebMethods. A challenge found with small businesses is they typically do not have the bargaining power to dictate trading processes and may have to support many processes in order to increase access to the market place.

What is needed, therefore, is an e-commerce platform that allows multiple document exchange definitions while providing a message collaboration trail.

**SUMMARY**

It has been discovered that an intermediary e-commerce HUB provides multiple document exchange definition support while managing message collaboration trails. The e-commerce HUB receives a message from an initiator, assigns the messages to a transaction instance, translates the message, and forwards the translated message to target trading partners.

The HUB receives a message and determines if the message is part of an existing transaction processing instance. If the message is part of an existing transaction processing instance, the HUB verifies that the message is appropriate for the existing processing state. For example, an invoice message should not occur prior to a purchase order message.

Once the HUB verifies the message is appropriate for the existing processing state, the HUB increments the processing state and retrieves profile information corresponding to a first target participant. The profile includes the targeted participants accepted business processes. The HUB formats the message corresponding to the target participant's business processes and sends the formatted message to the target participant. If there are more target participants, the HUB formats and sends the message corresponding to each target participant's profile.

The HUB facilitates business process matching between members by providing document translation (i.e. converting a cXML purchase order to an EDI purchase order) and

business process translation (i.e. converting a Rosetta Net Partner Interface Process (PIP) to an EDI process).

5 The HUB may also be used as a trading partner screening mechanism. A member may specify trading partner qualification criteria or even block messages from a business with which the member has had a previous bad experience.

10 The HUB may be used as an advertising tool. HUB members may search the member database for potential trading partners that support a specific business process. A potential trading partner may advertise its supported electronic business processes and potentially win business from members searching for potential trading partners.

15 The foregoing is a summary and thus contains, by necessity, simplifications, generalizations, and omissions of detail; consequently, those skilled in the art will appreciate that the summary is illustrative only and is not intended to be in any way limiting. Other aspects, inventive features, and advantages of the present  
20 invention, as defined solely by the claims, will become apparent in the non-limiting detailed description set forth below.

**BRIEF DESCRIPTION OF THE DRAWINGS**

The present invention may be better understood, and its numerous objects, features, and advantages made apparent to those skilled in the art by referencing the accompanying drawings. The use of the same reference symbols in different drawings indicates similar or identical items.

**Figure 1** is a high-level diagram showing an initiator sending a message to a participant through an e-commerce HUB;

**Figure 2** is a flowchart showing steps taken in processing a message from an initiator;

**Figure 3** is a flowchart showing steps taken in processing a new HUB transaction instance;

**Figure 4** is a flowchart showing steps taken in processing a message that is part of an existing transaction instance;

**Figure 5** is a flowchart showing steps taken in processing a message through a web interface;

**Figure 6** is a flowchart showing a member searching for compatible trading partners;

**Figure 7** is a flowchart showing steps taken in processing profile requests;

**Figure 8** is a flowchart showing steps taken in configuring a new member profile; and

**Figure 9** is a block diagram of an information handling system capable of implementing the present invention.

**DETAILED DESCRIPTION**

The following is intended to provide a detailed description of an example of the invention and should not be taken to be limiting of the invention itself. Rather,  
5 any number of variations may fall within the scope of the invention which is defined in the claims following the description.

**Figure 1** is a high-level diagram showing an initiator sending a message to a responder through an e-commerce HUB.

- 10 Initiator **100** sends message **105** to HUB **120** through computer network **110**, such as the Internet. Computer network forwards message **115** to HUB **120**. HUB **120** examines the message to determine if the message is requesting information from the HUB or if the message is to be  
15 forwarded to target participants.

- If message **115** is requesting HUB information, such as the state of existing transaction instantiations, HUB **120** retrieves the information corresponding to the request from HUB store **130**. HUB store **130** may be stored in a non-  
20 volatile storage area, such as a computer hard drive. HUB **120** sends message **135** which includes the requested information to computer network **110**. Computer network **110** forwards message **160** to initiator **100** to complete the message request response.

- 25 If message **115** is to be forwarded to target participants, HUB **120** retrieves information from member profile **125** corresponding to initiator **100** and participant **145**. HUB **120** verifies that valid binding transaction processes are in place, and formats the message

corresponding to participant **145**'s business processes. HUB **120** sends formatted message **135** to computer network **110**. Computer network **110** forwards message **140** to participant **145**. Participant **145** analyzes the message, and sends  
5 response **150** to computer network **110**. Computer network **110** forwards message **115** to HUB **120** and HUB **120** includes the message in the existing transaction instance. HUB **120** formats the message corresponding to initiator **100**'s business processes, and sends formatted message **135** to  
10 computer network **110**. Computer network **110** sends message **160** to initiator **100**.

This transaction processing exchange continues until the final transaction corresponding to a transaction instance occurs, such as payment of an invoice. If HUB **120**  
15 receives a message not associated with a transaction instance, HUB **120** initiates a new transaction instance making the message the first message in the new instance.

In one embodiment, multiple participants may be recipients of messages and HUB **120** formats each message  
20 corresponding to each participant's business processes.

**Figure 2** is a flowchart showing steps taken in processing a message from an initiator. HUB processing commences at **200**, whereupon a message is received from initiator **220** at step **210**. A determination is made as to  
25 whether the message is from a program or from an interactive web-based interface (decision **230**). In one embodiment, a interactive web-based interface message may be an HTTP message with a particular URL destination location. If the message is from an interactive web-based  
30 interface, decision **230** branches to "Yes" branch **232**

whereupon the message is processed through web interface processing (pre-defined process block **240**, see **Figure 5** for further details).

On the other hand, if the message is from a program,  
5 decision **230** branches to "No" branch **238**. For example, the message may come from a purchasing program that automatically orders supplies. A determination is made as to whether the message is part of an existing transaction instance (step **250**). In one embodiment, the message header  
10 includes an instance number corresponding to an existing transaction instance. For example, the message may be an invoice in response to a purchase order.

If the message is part of an existing HUB transaction instance, decision **250** branches to "Yes" branch **258**  
15 whereupon the message is processed corresponding to its instance (pre-defined process block **270**, see **Figure 4** for further details).

On the other hand, if the message is not part of an existing HUB transaction instance, decision **250** branches to  
20 "No" branch **252** whereupon a new HUB transaction instance is initiated and the message is processed (pre-defined process block **260**, see **Figure 3** for further details).

Processing ends at **280**.

**Figure 3** is a flowchart showing steps taken in  
25 processing a new HUB transaction instance. New transaction instance processing commences at **300**, whereupon the received message is examined to establish the message type, the initiator, and the target participants (step **310**).



The initiator and first target participant profiles are retrieved from member profile **325** (step **320**). A determination is made as to whether the initiator and first target participant are identified trading partners (decision **330**). In one embodiment, the target participant's member profile includes trading partners corresponding to the target participant (i.e. meeting the target participants qualifications).

If the initiator and target participant are identified trading partners, decision **330** branches to "Yes" branch **332** whereupon a determination is made as to whether the trading partners have a known transaction process which links, or translates, the initiator's business process to the target participant's process (decision **335**). In one embodiment, the target participant's member profile includes the transaction process which links the initiator's business process and the target participant's business process.

If the initiator and target participant do not have a known transaction process, decision **335** branches to "No" branch **339** whereupon a determination is made as to whether the HUB has a transaction processing implementation that binds the initiator's process to the target participant's process (decision **355**). If the trading partners have a known transaction process or if there is a transaction processing implementation in place, decision **335** branches to "Yes" branch **337** or decision **355** branches to "Yes" branch **359**, respectively, and the message starts a new HUB instantiation using the current message as the first message (step **340**). The message is processed using its associated new instance (pre-defined process block **345**, see **Figure 4** for further details).

Returning to decision **330**, if the initiator and target participant are not identified trading partners, decision **330** branches to "No" branch **334** whereupon a determination is made as to whether the target profile excludes trading with the message initiator (decision **350**). For example, the target participant may have had a bad experience with the initiator and does not want to have further business transactions with the initiator. This information is indicated in the target participants profile.

10 If the target profile excludes trading with the message initiator, decision **350** branches to "Yes" branch **352** whereupon a rejection message is sent informing the initiator that the initiator is not authorized to conduct business with the target participant (step **370**).

15 On the other hand, if the target profile does not exclude trading with the message initiator, decision **350** branches to "No" branch **354** whereupon a determination is made as to whether the HUB has a transaction processing implementation that binds the initiator's process to the target participant's process (decision **355**). In one embodiment, a list of binding transaction implementation processes may be stored in a look-up table located in a HUB storage area. For example, a lookup table entry may include binding a Rosetta Net PIP process to an EDI process. If there is a transaction processing implementation in place, decision **355** branches to "Yes" branch **359** and the message starts a new HUB instantiation using the transaction processing implementation.

On the other hand, if there is not a transaction processing implementation in place, decision **355** branches

to "No" branch **357** whereupon a message is sent to the initiator that a new HUB transaction processing implementation must be implemented and that the initiator may use interactive forms in the interim (step **360**).

- 5        A determination is made as to whether there are more target participants of the current message (decision **380**). If there are more target participants of the current message, decision **380** branches to "Yes" branch **382** which loops back to select the next target participant profile
- 10    (step **385**), and process the next participant. This looping continues until there are no more target participants of the current message, at which point decision **380** branches to "No" branch **384** and processing ends at **390**.

- 15        **Figure 4** is a flowchart showing steps taken in processing a message that is part of an existing transaction instance. Transaction instance processing commences at **400**, whereupon processing waits for a message (step **410**). When a message is received, a determination is made as to whether the message is appropriate for the state
- 20    of transaction processing (decision **420**). In one embodiment, a lookup table stores the current state of a transaction instance and also includes allowable subsequent message types. For example, an invoice message may not arrive before a purchase order message is sent.

- 25        If the message is not appropriate for the state of transaction processing, decision **420** branches to "No" branch **422** whereupon a message is prepared informing the message initiator of the error (step **425**) and processing ends at **435**. On the other hand, if the message is
- 30    appropriate for the state of transaction processing,

decision **420** branches to "Yes" branch **424** whereupon the state of transaction processing is advanced and a message is prepared to inform the trading participants of the advancement (step **430**).

5       The first trading participant is selected from the initiator's member profile at **440**, and a determination is made as to whether the participant participates interactively or through programs (decision **450**). In one embodiment, the target participant's profile includes  
10 information describing how the target participant participates. If the participant participates interactively, decision **450** branches to "Yes" branch **452** whereupon processing generates a web presentation of the message and sends the message to the participant (step  
15 **455**).

On the other hand, if the participant participates through programs, decision **450** branches to "No" branch **454** whereupon a message is sent to the participant through client-server programming methods (decision **460**).

20       A determination is made as to whether there are more trading participants for the corresponding instance (decision **470**). If there are more trading participants, decision **470** branches to "Yes" branch **472** which loops back to select the next participant (step **475**) and process the  
25 next participant.

This looping continues until there are no more trading participants for the corresponding instance, at which point decision **470** branches to "No" branch **474** whereupon a determination is made as to whether the current message  
30 terminates the transaction (decision **480**). In one

embodiment, a message type may be selected that ends a particular transaction process, such as a confirmation of receipt of payment. Once the transaction is terminated, the transaction history may be stored in a history file for  
5 future retrieval.

If the current message does not terminate the transaction, decision **480** branches to "No" branch **482** which loops back to process the next message. This looping continues until the transaction is terminated, at which  
10 point decision **480** branches to "Yes" branch **488** and processing ends at **490**.

**Figure 5** is a flowchart showing steps taken in processing a message through a web interface. Web interface processing commences at **500**, whereupon login  
15 information is retrieved from user **505** (step **510**). Navigation options are presented to the user at step **520**.

If the user chooses to change profiles, the user proceeds to profile changes (pre-defined process block **525**, see **Figure 7** for further details). If the user chooses to  
20 search for potential trading partners, the user proceeds to browsing potential transaction partners (pre-defined process block **535**, see **Figure 6** for further details).

If the user chooses to participate in a transaction, the user proceeds to actively participate in the  
25 transaction process (step **530**). Navigation options are presented to the active participant at step **540**.

If the user chooses to view the state or messages of an existing transaction instance, the user proceeds to step  
**545**. In one embodiment, the user enters a user name and

password and a list of instances corresponding to the user are retrieved from a HUB storage area. The list of instances may include active instances and terminated instances organized by date, target partners, status, or  
5 instance number. The process state and messages are displayed corresponding to the selected instance (step 550).

If the user chooses to input a message corresponding to an existing transaction, the user proceeds to step 555.  
10 User input is received at step 570, and forwarded for transaction processing at step 580.

If the user chooses to initiate a new interactive transaction-processing instance, the user proceeds to step 560 and provides a first message input that becomes the  
15 first message in the new instance.

Processing ends at 590.

**Figure 6** is a flowchart showing a member searching for compatible trading partners. Browse processing commences at 600, whereupon user 605 locates a prospective trading  
20 partner in HUB store 615 (step 610). HUB store 615 may be stored in a non-volatile storage area, such as a computer hard drive. HUB supported transaction processes are retrieved corresponding to the prospective trading partner's business processes (step 620). For example, a  
25 HUB supported transaction process may be converting a Rosetta Net PIP to an EDI process.

A determination is made as to whether one of the HUB's supported transaction processes match one of user 605's business processes (decision 630). If one of the HUB

processes match one of user **605**'s processes, decision **630** branches to "Yes" branch **632** whereupon a client-server transaction is initiated between the initiator and the prospective trading partner (step **640**). A HUB member may  
5 use the HUB as an advertising tool to attract business. For example, the member may advertise its supported business processes in order to be recognized by initiators searching for prospective trading partners.

On the other hand, if a HUB process is not found that  
10 match user **605**'s processes, decision **630** branches to "No" branch **638** whereupon a determination is made as to whether the user wants to contract for a HUB processing extension that bridges the user's processing with the prospective trading partner's business process (decision **650**).

15 If the user decides to contract for a HUB extension, decision **650** branches to "Yes" branch **652** whereupon the user contacts HUB administration to generate the HUB processing extension. For example, the user may have a custom business process and may request the HUB  
20 administration to generate a processing extension that translates the user's custom business process in order to correspond with other HUB members. On the other hand, if the user does not want to contract for a HUB extension, decision **658** branches to "No" branch **658** whereupon the user  
25 interacts with the prospective trading partner through web based messages (step **670**). Processing ends at **680**.

**Figure 7** is a flowchart showing steps taken in processing profile requests. Profile processing commences at **700**, whereupon a request is received from user **720** (step  
30 **710**). Processing searches for the user's member profile at

step **725** and determination is made as to whether the user is a HUB member (decision **730**).

If the user is a HUB member, decision **730** branches to "Yes" branch **732** whereupon the user's profile is retrieved  
5 from HUB store **750** (step **740**). HUB store **750** may be stored in a non-volatile storage area, such as a computer hard drive. Changes are made corresponding to the user's request at step **760**.

On the other hand, if the user is not a HUB member,  
10 decision **730** branches to "No" branch **738** whereupon a determination is made as to whether the user wants to be a new member (decision **770**).

If the user chooses to be a new member, decision **770** branches to "Yes" branch **778** whereupon new member  
15 processing takes place (pre-defined process block **780**, see **Figure 8** for further details). On the other hand, if the user does not want to be a new member, decision **770** branches to "No" branch **772** bypassing new member processing. Processing returns at **790**.

20 **Figure 8** is a flowchart showing steps taken in configuring a new member profile. New member processing commences at **800**, whereupon a new member location is initiated in member profile **825** (step **810**). Member profile **825** may be stored in a non-volatile storage area, such as a  
25 computer hard drive.

Processing requests a business name from new member **815** at step **820**. A business name is received and stored in member profile **825** (step **830**). Processing requests preferred business process information from new member **815**



at step **840**. For example, new member **815** may use EDI to conduct business transactions. The preferred business processes are received and stored in member profile (step **850**).

5        Processing requests preferred trading partners from new member **815** at step **860**. Preferred trading partners are received and stored in member profile **825** (step **870**). Processing request partner qualification criteria from new member **815** at step **880**. For example, new member **815** may  
10    wish to conduct business only with six sigma suppliers, or with suppliers that maintain a certain annual revenue level. Trading partner qualification criteria is received and stored in member profile **825** (step **890**). Processing ends at **895**.

15        **Figure 9** illustrates information handling system **901** which is a simplified example of a computer system capable of performing the server and client operations described herein. Computer system **901** includes processor **900** which is coupled to host bus **905**. A level two (L2) cache memory  
20    **910** is also coupled to the host bus **905**. Host-to-PCI bridge **915** is coupled to main memory **920**, includes cache memory and main memory control functions, and provides bus control to handle transfers among PCI bus **925**, processor **900**, L2 cache **910**, main memory **920**, and host bus **905**. PCI  
25    bus **925** provides an interface for a variety of devices including, for example, LAN card **930**. PCI-to-ISA bridge **935** provides bus control to handle transfers between PCI bus **925** and ISA bus **940**, universal serial bus (USB) functionality **945**, IDE device functionality **950**, power  
30    management functionality **955**, and can include other

functional elements not shown, such as a real-time clock (RTC), DMA control, interrupt support, and system management bus support. Peripheral devices and input/output (I/O) devices can be attached to various  
5 interfaces **960** (e.g., parallel interface **962**, serial interface **964**, infrared (IR) interface **966**, keyboard interface **968**, mouse interface **970**, and fixed disk (HDD) **972**) coupled to ISA bus **940**. Alternatively, many I/O  
10 devices can be accommodated by a super I/O controller (not shown) attached to ISA bus **940**.

BIOS **980** is coupled to ISA bus **940**, and incorporates the necessary processor executable code for a variety of low-level system functions and system boot functions. BIOS **980** can be stored in any computer readable medium,  
15 including magnetic storage media, optical storage media, flash memory, random access memory, read only memory, and communications media conveying signals encoding the instructions (e.g., signals from a network). In order to attach computer system **901** to another computer system to  
20 copy files over a network, LAN card **930** is coupled to PCI bus **925** and to PCI-to-ISA bridge **935**. Similarly, to connect computer system **901** to an ISP to connect to the Internet using a telephone line connection, modem **975** is connected to serial port **964** and PCI-to-ISA Bridge **935**.

25 While the computer system described in **Figure 9** is capable of executing the invention described herein, this computer system is simply one example of a computer system. Those skilled in the art will appreciate that many other computer system designs are capable of performing the  
30 invention described herein.

One of the preferred implementations of the invention is an application, namely, a set of instructions (program code) in a code module which may, for example, be resident in the random access memory of the computer. Until  
5 required by the computer, the set of instructions may be stored in another computer memory, for example, on a hard disk drive, or in removable storage such as an optical disk (for eventual use in a CD ROM) or floppy disk (for eventual use in a floppy disk drive), or downloaded via the Internet  
10 or other computer network. Thus, the present invention may be implemented as a computer program product for use in a computer. In addition, although the various methods described are conveniently implemented in a general purpose computer selectively activated or reconfigured by software,  
15 one of ordinary skill in the art would also recognize that such methods may be carried out in hardware, in firmware, or in more specialized apparatus constructed to perform the required method steps.

While particular embodiments of the present invention  
20 have been shown and described, it will be obvious to those skilled in the art that, based upon the teachings herein, changes and modifications may be made without departing from this invention and its broader aspects and, therefore, the appended claims are to encompass within their scope all  
25 such changes and modifications as are within the true spirit and scope of this invention. Furthermore, it is to be understood that the invention is solely defined by the appended claims. It will be understood by those with skill in the art that if a specific number of an introduced claim  
30 element is intended, such intent will be explicitly recited in the claim, and in the absence of such recitation no such

limitation is present. For a non-limiting example, as an aid to understanding, the following appended claims contain usage of the introductory phrases "at least one" and "one or more" to introduce claim elements. However, the use of

5 such phrases should not be construed to imply that the introduction of a claim element by the indefinite articles "a" or "an" limits any particular claim containing such introduced claim element to inventions containing only one such element, even when the same claim includes the

10 introductory phrases "one or more" or "at least one" and indefinite articles such as "a" or "an"; the same holds true for the use in the claims of definite articles.

IBM CORPORATION  
ARMONK, NEW YORK 10504  
ATTORNEY  
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IBM CORPORATION  
ARMONK, NEW YORK 10504